PROCEDURE FOR OBTAINING EX NUMBERS UNDER APA STANDARD 87-1

Note: to expedite your application, be sure to use the APA Fireworks Approval Application 5/2007

1. Complete an EX Number application following the guidelines on the next pages.

Note 1: An application can be as broad (*e.g.*, cylindrical star shell covering an assortment of colors) or as specific (*e.g.*, 3 inch red and green cylindrical star shell) as you wish. It is your choice whether you wish to have a few or many EX numbers covering your products.

Note 2: If an item may be sold under several different names to different customers, use your product code or item number for the "item name" section of the EX number application. This will enable you to ship the item under various product names without having to revise your EX number listing every time you change the item name.

2. For item 9, thermal stability test, have the manufacturer, or yourself, follow the procedure given on the thermal stability test page. Complete item 9 of the application, filling in the information on the person who actually ran the test, as well as the test results. The manufacturer, importer, or any testing laboratory can perform the test.

3. Prepare a **cover sheet** (see example on page D-4) to accompany your application. If you are submitting applications for more than one item, only one cover sheet is required. Please **do not staple** your applications. DOT scans applications into a computer, and staples can cause delays in processing. The complete application, including cover sheet, diagram of the item, list of chemicals, and certification signature insuring conformance to APA Standard 87-1 should then be forwarded to:

Dr. Richard Tarr
U.S. Department of Transportation
Office of Approvals - PHH-30
1200 New Jersey Avenue, SE
East Building, 2nd Floor
Washington, DC. 20590-0001

For additional information regarding applications for EX numbers under APA Standard 87-1, contact:

Ms. Julie L. Heckman American Pyrotechnics Association 301-907-8181	or	Dr. Richard Tarr U.S. Department of Transportation 202-366-4496

GUIDELINES ON COMPLETING AN APPLICATION FOR AN EX NUMBER

1. **Item Name** - Use the actual item name, the name of the series, if applicable, or an item number. (*i.e.*, 3 Inch Red Star Shell (specific item,) XYZ Display Shell Series (for a series of shells of different effects and sizes,) or F001-18 (item number).)

2. **Name and Address of the Applicant** - This can be either the manufacturer or an importer/distributor. The name of a responsible person (and their job title) at the applicant company must also be given. Be sure to provide this name in **English**. Provide a telephone number, email address and fax number.

3. **DOT Class** – Check: Fireworks, UN0333, 1.1G; Fireworks, UN0335, 1.3G; or Fireworks, UN 0336, 1.4G—whichever is correct for the item in question. For a pyrotechnic device intended for professional use in the entertainment industry, use the Article, Pyrotechnic UN 0431, 1.4G, if the weight of pyrotechnic composition meets the limits for a 1.4G fireworks device.

4. **Manufacturer** - Provide the name, address, and telephone number of the actual manufacturer of the fireworks.

5. **Category of Device** – Check the appropriate category, *i.e.*: mine/shell, rocket, cylind. fountain, etc. If the specific category is not listed, check "other" and write in the correct category.

6. **Diagram of the Device** - VERY IMPORTANT: This must identify all of the internal components, in English. Indicate dimensions on the diagram also. Identify things such as fuse location, clay plugs, lift charge or propellant, stars, etc. If the diagram is not clear, approval will be delayed. (see additional information on pages D-4 & D-5)

   Note: If the device is produced in more than one size, indicate the dimensions for each size. If the application covers a series of devices, show a typical, representative diagram for one item in the series.

7. **Chemical Composition** - First, be certain that all of the chemicals used in the device(s) are listed in table 4.3-1. Then complete the chemical composition sheet, which is found on page 3 of the EX number application (12/01 version.)

   a) First, list the name of the device, (or series) and the total weight of pyrotechnic composition in the device. For a series of items, list the maximum total weight that is used in the largest item in the series.

   b) Then, list the name of each type of chemical composition used in the device, (or series) and the maximum weight of that composition used in the device (or used in any item in the series.) (*i.e.*: Red star, 15 g; black powder propellant, 10 g; report powder, 125 mg per report.)

c) Then complete the chemical composition sheet. DOT prefers that you list the percentage by weight of each chemical used in each composition, but it is acceptable to merely check the chemicals that are used in each composition. For chemicals that are not listed on the chemical sheet, but are listed on table 4.3-1, enter these chemicals in the *Other Chemicals* spaces. Use the chemical names as they are given in this Standard.

8. **Description of the Device** - Fill in the information requested. Also briefly describe the effect that is produced (examples: shoots red stars into the air; emits a shower of green and red sparks.).

9. **Thermal Stability Test** - This test must be performed prior to submitting the item for approval.

10. **Certification** - This section must be dated, and must be signed by the applicant, the person listed in section 2 on page 1 of the application. This is the person that DOT will direct any questions to regarding the application.

Checklist: Your file for each device must consist of:

1. The application itself (following guidelines 1-10.) Be sure it is signed and dated.

2. An attached diagram of device page.

3. A chemical composition page (page 3 of the application, use additional copies of this page if needed to list all chemical compositions used in the device.)

EX Number Procedure

SAMPLE COVER LETTER TO INCLUDE WITH EX NUMBER APPLICATIONS UNDER APA 87-1

Note: Should be on Company Letterhead

(date of letter)

Dr. Richard Tarr, DHM-30
Office of Exemptions and Approvals
U.S. Department of Transportation
400 7th Street, SW
Washington, DC 20590

Dear Dr. Tarr:

We wish to request transportation approval and classification for the devices described on the enclosed fireworks applications, submitted under the provisions of APA Standard 87-1.

Classification is requested for these devices as Fireworks UN0336, 1.4G. (or: Fireworks UN0333, 1.1G; Fireworks UN0335, 1.3G; or Article, Pyrotechnic, 1.4G UN0431)

The approval letter, or any questions relating to this application request, should be sent to the address listed on the enclosed approval requests.

Thank you for your attention to this request.

Yours truly,

(signature, title and company name)

Dr. Richard Tarr
U.S. Department of Transportation
Office of Approvals - PHH-30
1200 New Jersey Avenue, SE
East Building, 2nd Floor
Washington, DC. 20590-0001

Dear Dr. Tarr:

We wish to request transportation approval and classification for the devices described on the enclosed fireworks applications, submitted under the provisions of APA Standard 87-1. Classification is requested for these devices as Fireworks UN0336, 1.4G)or Fireworks UN0335, 1.3G) or Article, Pyrotechnic, 1.4G UN0431.

The approval letter, or any questions relating to this application request, should be sent to the address listed on the enclosed requests. Thank you for you attention to this request.

Yours truly,

(Signature, title, and company name)

Additional Details Regarding the Diagram of the Device (item 6 in the EX number application):

1. English must be used to identify all internal components.

2. Internal and external dimensions of tubes and bases must be shown on the diagram, including length and diameter (metric values should be used.)

3. The point where external ignition fuse enters the device must be shown, as well as the connection sequence of all internal fuses. Any **empty** tubes used to complete the geometric pattern of a multiple-tube device must be clearly marked, "empty tube."

4. All names given (of the item as well as the internal components) **must** correspond to the description of the device contained in the EX number application. Identification of chemical compositions in the diagram must also correspond to the terms used on the chemical composition page. (*i.e.*, if the term, bursting charge, is used on the diagram to indicate the location of a composition found in the device, the chemical composition (and weight) of the bursting charge must be given on the chemical composition page.)

5. Original drawings of each diagram (or very clear copies) must be provided. Faxed copies may be used, but only if they are very clear and sent from original drawings.

   Note: If the diagrams are not clearly and carefully prepared, it will be very difficult to obtain an EX number for an item. DOT will reject the application rather than spend time trying to figure out a confusing drawing.

THERMAL STABILITY TEST FOR FIREWORKS

Any fireworks device approved for transportation as a 1.1G, 1.3G or 1.4G explosive by DOT must be thermally stable. The explosive material must not ignite spontaneously or undergo marked decomposition when subjected to a temperature of 167° F (75° C) for 48 consecutive hours.

Thermal stability test is performed by placing a weighed sample in a preheated oven. The oven temperature should be monitored throughout the experiment to determine that a minimum temperature of 75° C is maintained. The sample is removed after 48 hours and it is allowed to cool to room temperature. The sample is checked visually for any noticeable decomposition, and it is then re-weighed. The weight loss should be minimal, and no significant change in color or physical appearance should be noticeable. The sample fails the thermal stability test if it ignites, explodes, or markedly decomposes during the testing.

Note: It is strongly recommended that the thermal stability **not** be conducted on large, intact devices, which could produce devastating consequences in the event of an ignition during

testing. The **components** used in such large fireworks can be tested, rather than the complete device. Any components that would be in contact with each other in the finished item must be placed in contact for the thermal stability testing. The sample should be placed in a pan or on aluminum foil during the test to prevent any pyrotechnic dust or particles from contaminating the oven. The oven should be cleaned on a regular basis.

Equipment

A commercial laboratory-type oven is best for conducting the thermal stability test and explosion-proof wiring and equipment is preferred. An oven capable of controlling temperature to $\pm$ 2° C is preferred for the test.

A major factor in the selection of equipment and design of the test facility will be the type of fireworks to be tested. If quantities of pyrotechnic composition in excess of several grams are to be tested, the thermal stability tests must be conducted in an isolated facility. Personnel should not be working in the vicinity of an un-barricaded oven while a thermal stability test is in progress.

Safety is critical in the performance of thermal stability tests. It must be assumed that there is a distinct possibility that the sample will ignite during the test, and precautions must be taken to minimize the consequences of ignition and the resultant fire or explosion.

Complete section 9 of the EX number application (thermal stability test results) once the test has been completed. Indicate whether the test was performed on the finished item, or on the components as they are present together in the item.

Fireworks Approval Application – APA Standard 87-1 (version 12/01) pg. 1

1. Item Name: XYZ Fountain

2. Applicant:

Name/Title: Bill Smith, Gen. Manager
Company Name: XYZ Fireworks Co.
Address: 110 Main St., Paducah, KY, 77224
Phone/Fax: Tel: 645-234-5678 Fax: 645-234-2577
Email:

Note: It is best for the Applicant to provide a U.S. address, fax number, and email address so correspondence relating to this application will reach you in a timely manner.

3. DOT Class:

❑ Fireworks, UN 0333, 1.1G ☑ Fireworks UN 0336, 1.4G
❑ Fireworks, UN 0335, 1.3G ❑ Article, PyrotechnicUN0431, 1.4G
❑ Other: _____

4. Manufacturer: *(Complete only if different from "Applicant" named above)*

Company Name: Hunan Dragon Fireworks Factory
Address: No. 5, Main Street
Liuyang City, Hunan, CHINA
Phone: (optional)

5. Category of Device (under APA 87-1):

❑ Aerial Shell (1.1G) ❑ Aerial Shell (1.3G) ☑ Cylind. Fountain
❑ Mine/Shell ❑ Rocket ❑ Roman candle ❑ Other: _____

6. Diagram of the Device: See attached sheet

7. Chemical Composition: The individual formulas and the powder weights are listed on an attached sheet. All chemicals used in this device are listed in Table 4.3-1 of APA Standard 87-1.

Fireworks Approval Application – APA Standard 87-1 (version 12/01) pg. 2

8. Description of Device: (use "NA" when not applicable)

Number of tubes: 4

Diameter of device (or range of diameters for a series): 18 mm

Maximum powder weight per tube: 49g

For 1.4G mine/shell: Max. propellant/tube: 5g

Maximum effect/tube: 7g

Total powder weight in device: 196g

Tubes are fused in sequence (if UN0336 multiple-tube item) (yes / no) Yes

Item Complies with base/height ratio, if UN0336 (yes / no) Yes

Does item have a report? No *If yes, max. wt. of report* ____ mg

Effect produced (*e.g.*, shoots red star in air): Sprays red, green, crackling and silver microstars 12 feet into the air.

9. Thermal stability test results:

A thermal stability test of this device was performed on

8/5/01	William Wang	Test Engineer	Hunan Dragon
(date)	(name of tester)	(job title)	(company)

The test was performed on: ❑ **finished item** ☑ **component chemical mixtures**, as present together in the device. The device did not ignite, explode, or undergo any significant decomposition during heating at 75º C (167º F) for 48 hours.

10. Certification:

This is to certify that the device for which approval is requested conforms to APA Standard 87-1 and that the descriptions and technical information contained in this application are complete and accurate.

9/9/01	Bill Smith
(Date)	(Signature of applicant named in #1 above)

Fireworks Chemical Composition Sheet APA Standard 87-1 (version 12/01) pg. 3

Chemical Composition List for (Item Name): XYZ Fountain
Total weight of pyrotechnic composition in Item: 196 g

Effect and total weight for each composition (e.g., red star, 21 g; propellant, 18 g):

1. Red stars, 24 g
2. Fountain comp, 100 g
3. Green stars, 24 g
4. Crackling star, 24g
5. Silver stars, 24 g
6. N/A _____, __g

Chemicals[1]		**Weight %** 1	2	3	4	5	6
Potassium Nitrate	KNO_3			42	70	15	
Potassium Perchlorate	$KClO_4$	42	25				
Ammonium Perchlorate	NH_4ClO_4						
Barium Nitrate	$Ba(NO_3)_2$		35				
Strontium Nitrate	$Sr(NO_3)_2$						
Sulfur				10	8	15	
Charcoal				10	22		
Aluminum							
Magnallum	Mg/Al alloy	15	15	24		30	
Dextrine							

Other Chemicals[2]		**Weight %** 1	2	3	4	5	6
Strontium Carbonate		18					
Polyvinyl Chloride		10	10				
Shellac		15	15	14		10	
Copper Oxide	CaO					30	
Bismouth Oxide	Bi_2O_3						

Restricted Chemicals[3]		**Weight %** 1	2	3	4	5	6
Potassium Chlorate	$KClO_3$						
Magnesium							
Titanium (>100 mesh)							

[1] The above list is taken from Table 4.3-1 of APA Standard 87-1, "Standard of Fireworks Chemicals".
[2] Each chemical must be listed in Table 4.3-1of APA Standard 87-1, "Standard of Fireworks Chemicals".
[3] For specifics on the Restricted Chemicals, see APA Standard 87-1

EX number procedure (version 12/01)

Representative Diagram of Device – APA Standard 87-1